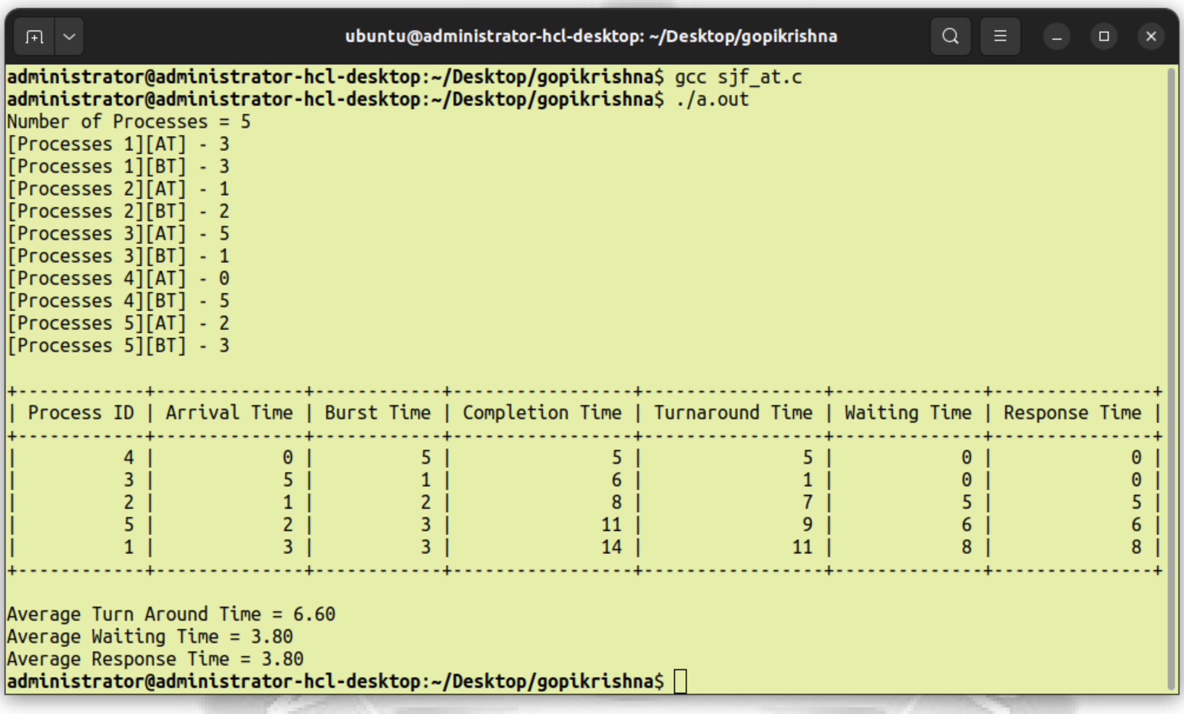
PROGRAM CODE

```
#include<stdio.h>

int pn;
int pno[10],at[10],bt[10],ct[10],tat[10],wt[10],rt[10];
float avg_waiting,avg_turnaround,avg_response;
int twt = 0,ttat = 0,trt = 0,curt = 0;

void sortAT();
void sortBT();
void calc_SJF();
void printTable();

void main()
{
    printf("Number of Processes = ");
    scanf("%d", &pn);

    for (int i = 0; i < pn; i++)
    {
        pno[i]=i+1;
        printf("[Processes %d][AT] - ",i+1);
        scanf("%d", &at[i]);
        printf("[Processes %d][BT] - ",i+1);
        scanf("%d", &bt[i]);
    }
    sortAT(pn);
    sortBT(pn);
    calc_SJF(pn);
    printTable(pn);
}

void sortAT(int n)
{
    for (int i = 0; i < n - 1; i++)
    {
        for (int j = 0; j < n - i - 1; j++)
        {
            if (at[j] > at[j + 1])
            {
                int temp_pno = pno[j];
                pno[j] = pno[j + 1];
                pno[j + 1] = temp_pno;

                int temp_at = at[j];
                at[j] = at[j + 1];
                at[j + 1] = temp_at;

                int temp_bt = bt[j];
                bt[j] = bt[j + 1];
                bt[j + 1] = temp_bt;
            }
        }
    }
}
```

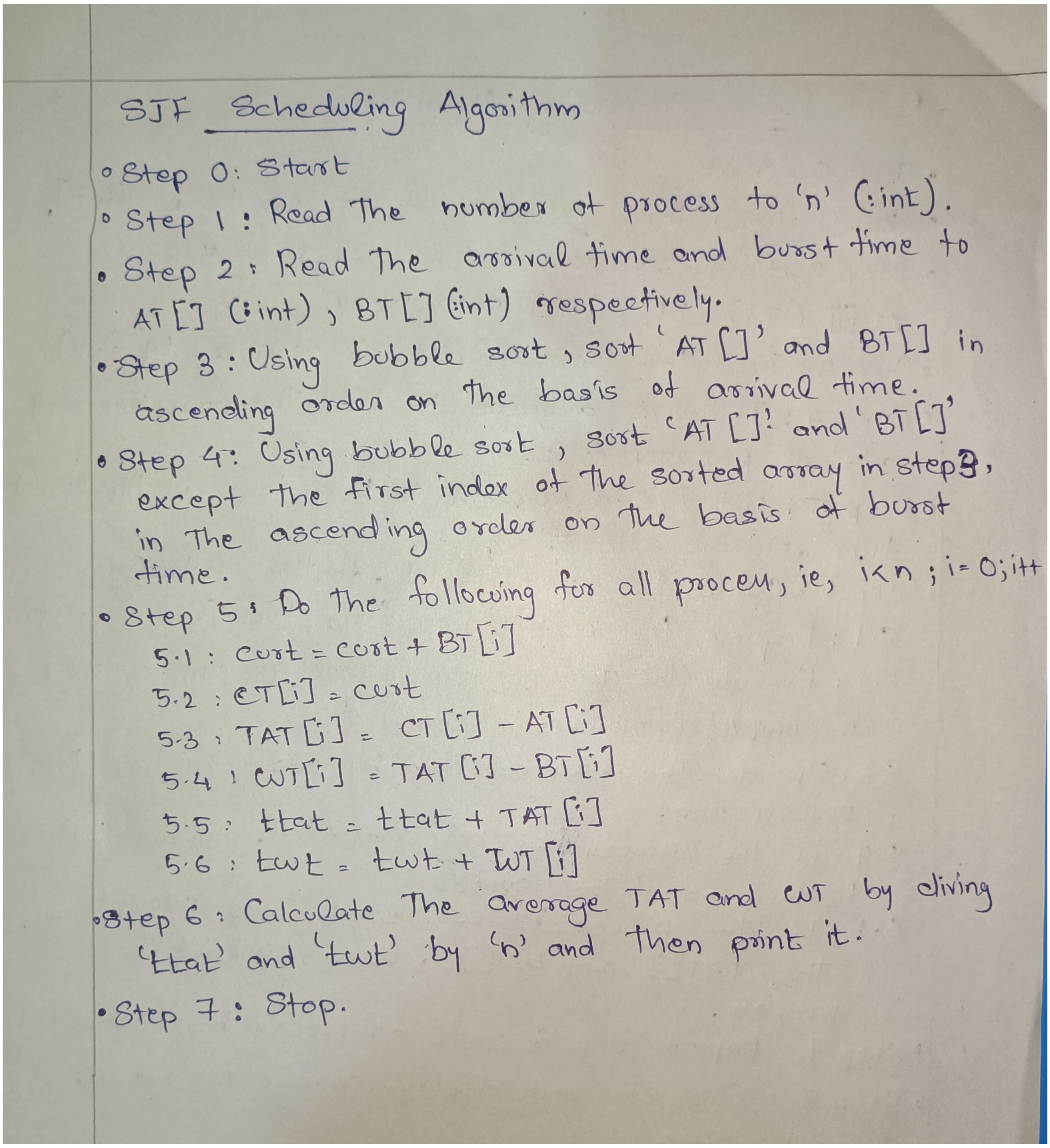
```
void sortBT(int n)
{
    for (int i = 1; i < n - 1; i++)
    {
        for (int j = 1; j < n - i; j++)
        {
            if (bt[j] > bt[j + 1])
            {
                int temp_pno = pno[j];
                pno[j] = pno[j + 1];
                pno[j + 1] = temp_pno;

                int temp_at = at[j];
                at[j] = at[j + 1];
                at[j + 1] = temp_at;

                int temp_bt = bt[j];
                bt[j] = bt[j + 1];
                bt[j + 1] = temp_bt;
            }
        }
    }
}

void calc_SJF(int n)
{
    int completed=0;
    for (int i = 0; i < n; i++) {
        ct[i] = curt + bt[i];
        tat[i] = ct[i] - at[i];
        wt[i] = tat[i] - bt[i];
        rt[i] = wt[i];
        curt += bt[i];
        completed++;

        twt += wt[i];
        ttat += tat[i];
        trt += rt[i];
    }
    avg_waiting = (float)twt / n;
    avg_turnaround = (float)ttat / n;
    avg_response = (float)trt / n;
}

void printTable(int n)
{
    printf("\n+------------+--------------+------------+-----------------+-----------------+--------------+---------------+\
n");
    printf("| Process ID | Arrival Time | Burst Time | Completion Time | Turnaround Time | Waiting Time |
Response Time |\n");
    printf("+------------+--------------+------------+-----------------+-----------------+--------------+---------------+\
n");
    for (int i = 0; i < n; i++)
    {
        printf("| %10d | %12d |%11d | %15d |  %14d |%13d |%14d |\n",pno[i],at[i],bt[i],ct[i],tat[i],wt[i],rt[i]);
    }
    printf("+------------+--------------+------------+-----------------+-----------------+--------------+---------------+\
n");
    printf("\nAverage Turn Around Time = %.2f\n", avg_turnaround);
    printf("Average Waiting Time = %.2f\n", avg_waiting);
    printf("Average Response Time = %.2f\n", avg_response);
}
```

OUTPUT



```
administrator@administrator-hcl-desktop:~/Desktop/gopikrishna$ gcc sjf_at.c
administrator@administrator-hcl-desktop:~/Desktop/gopikrishna$ ./a.out
Number of Processes = 5
[Processes 1][AT] - 3
[Processes 1][BT] - 3
[Processes 2][AT] - 1
[Processes 2][BT] - 2
[Processes 3][AT] - 5
[Processes 3][BT] - 1
[Processes 4][AT] - 0
[Processes 4][BT] - 5
[Processes 5][AT] - 2
[Processes 5][BT] - 3

+------------+--------------+------------+-----------------+-----------------+--------------+---------------+
| Process ID | Arrival Time | Burst Time | Completion Time | Turnaround Time | Waiting Time | Response Time |
+------------+--------------+------------+-----------------+-----------------+--------------+---------------+
|          4 |            0 |          5 |               5 |               5 |            0 |             0 |
|          3 |            5 |          1 |               6 |               1 |            0 |             0 |
|          2 |            1 |          2 |               8 |               7 |            5 |             5 |
|          5 |            2 |          3 |              11 |               9 |            6 |             6 |
|          1 |            3 |          3 |              14 |              11 |            8 |             8 |
+------------+--------------+------------+-----------------+-----------------+--------------+---------------+

Average Turn Around Time = 6.60
Average Waiting Time = 3.80
Average Response Time = 3.80
administrator@administrator-hcl-desktop:~/Desktop/gopikrishna$ 
```

ALGORITHM



SJF Scheduling Algorithm

- Step 0: Start
- Step 1 : Read The number of process to 'n' (:int).
- Step 2 : Read The arrival time and burst time to AT[] (:int), BT[] (:int) respectively.
- Step 3 : Using bubble sort, sort 'AT[]' and BT[] in ascending order on the basis of arrival time.
- Step 4: Using bubble sort, sort 'AT[]' and 'BT[]' in step 3, except the first index of the sorted array in The ascending order on the basis of burst time.
- Step 5 : Do The following for all process, ie, i<n ; i=0;i++

```
5.1 : curt = curt + BT[i]
5.2 : CT[i] = curt
5.3 : TAT[i] = CT[i] - AT[i]
5.4 : WT[i] = TAT[i] - BT[i]
5.5 : ttat = ttat + TAT[i]
5.6 : twt = twt + WT[i]
```

- Step 6 : Calculate The average TAT and WT by diving 'ttat' and 'twt' by 'n' and then print it.
- Step 7 : Stop.